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## ABSTRACT

The paper reviews research on severe and profound hearing loss and notes implications for hearing impaired students of instrumental enrichment (IE), a cognitive learning approach featuring metacognition. The development of IE by R. Feuerstein is traced to initial work with disadvantaged groups who emigrated to Israel. Noted are such characteristics of IE as bridging exercises to promote transfer of skills to real life situations and content-free materials. IE goals are listed, including correcting deficient cognitive functions, developing motivation to work on a task because of the nature of the task and its mastery, and helping slow performers change attitudes toward themselves. A functional listing of program characteristics developed by R. Feuerstein is appended as is a brief description of the application of the model at Gallaudet College. A seven-page reference list concludes the document. (CL)

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THE CHALLENGE TO CONVENTIONAL ASSESSMENT AND TEACHING  
METHODS OF HEARING IMPAIRED LEARNERS BY REUVEN FEUERSTEIN'S  
THEORY AND THE LEARNING POTENTIAL ASSESSMENT DEVICE

By Mrs. Wanda E. Gill  
Fall 1984

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D R A F T

REVIEW OF THE LITERATURE

The cornerstone of learning is the development of cognitive processes. It is these cognitive processes that conventional assessment and teaching methods and the non-conventional methodology of Feuerstein address. The ability to store and retrieve information, identify sequences, solve problems, set goals, adapt, think, perceive and conceptualize from alternative viewpoints are basic to understanding. The impact of a severe and profound hearing loss on the development of cognitive processes greatly affects learning rate (Borvillian et. al., 1973; Conrad, 1972; Pollard, 1982; Swisher, 1976), style ('Browman, 1980; Bryden, 1963; Fiebert, 1967; Kelly, 1978), perception (Conrad, 1965; Day, 1981; Fromkin, 1980; Furth, 1961, 1964, 1966, 1971), and memory (Frunkin and Amisfeld, 1977; Lichtenstein, 1984).

Furth believes that reality is grasped through logical conceptual thinking and can be accomplished without oral language (1966) provided appropriate strategies are applied for learning (1973, 1965). Furth, in articles with Milgram (1965) and Youniss (1965; 1971) compares and contrasts the language experiences of hearing and deaf children and adolescents and concludes that deafness produces distortions in symbolic or language acquisition that is difficult to overcome.

The cognitive training strategies that were developed for the learning disabled were modeled from theories developed from the hearing population (Myklebust, 1960; Quigley and Kretschmer, 1982). Cognitive training emerged during the 1960's in special education when cognitive behavior modification, a term adapted from a Watson and Skinner concept, was used to promote self-control, self-reinforcement or some other internalized

through outside training change in behavior. These cognitive intervention programs had varying success, depending on the appropriateness of the strategy (Feuerstein, 1954, 1969, 1970, 1984; Krug, 1965; Mindel and McCay, 1971). These theory based training models were applied to hearing and deaf populations. The comparisons between hearing and non-hearing groups based on models developed on hearing populations abound in the literature (Arnold, 1979; Ceuerstein, 1968, 1969, 1980; Hatfield, 1978; Heinick, 1966; Martin, Rohr-Redding and Innes, 1983; McGill-Franzen and Gormley, 1980; Meirhenry, 1965; Moores, 1978). These comparisons invariably depicted the hearing disabled as functioning intellectually on a low level. Most recently authors have merely noted differences in cognitive functioning levels in a non-judgmental way rather than imply or state cognitive deficits as evidence of inferior intelligence in the hearing disabled (Vernon, 1968).

Teaching/learning strategies reflected compensation for hearing loss. Through multimodel teaching (Brooks, et. al., 1981) and learning (Ewoldt, 1981) now most visible with widespread computer usage (Culberson, 1974; Dugdale, 1978; Fulton, 1983; Grossman, 1983; Harding, 1982; Hazan, 1982; Stoker, 1983; Storm, 1983; and file communications adaptations (Johnston, 1982; Kelly, 1980; Ofiesh, 1983; Prokes, 1980; Propp, 1978; Ray, 1972; Stuckless, 1978; Thayn, 1078), these cognitive training strategies were implemented with hearing impaired students who were trained in total communication or manual communication or oral communication. Each communication system has proponents and opponents who philosophically differ on how and where training for the hearing impaired should begin. The methods, philosophies and results have been highlighted by Arnold (1984); Bellugi, Klima and Siple (1975); Bellugi and Siple (1974); Gaines (1980); Hoerlan (1976, 1978); Holmes and Holmes (1980); Jensema and Trybus (1975); Jonas (1979); Jordan (1979); Klima and Bellugi (1979); Kluwin and Kluwin

(1983); Newkirk et. al. (1980); Saleh (1965); Sewell (1971); and White and Stevenson (1975).

It is within this context of philosophical and practical differences on theoretical models and applications of assessment, intervention and communication styles and strategies that a new approach is being tried.

#### INSTRUMENTAL ENRICHMENT

Reuven Feuerstein, one of Piaget's students, developed a mediated learning experience known as Instrumental Enrichment as an assessment intervention assessment (pre-test, intervene, post-test) model for disadvantaged groups who emigrated to Isreal (Feuerstein, 1954, 1957, 1958, 1963, 1970, 1971, 1972, 1973, 1976).

Jonas and Martin (1984) provide an indication of Instrumental Enrichment in light of other cognitive needs. Instrumental enrichment uses a "metacognition" in that students can reflect on their thinking processes.

Unlike cognitive training programs that focus on impulsivity as a personality characteristic, Feuerstein's theory assumes that impulsivity is a characteristic of the "retarded performer" true to his lack of adequate mediated learning experience. Thus, Instrumental Enrichment assumes that impulsivity may be reduced or limited for a different reason than the other programs.

Instrumental Enrichment develops prerequisites for learning and does not assume that those prerequisites already exist in the learner.

Instrumental Enrichment recognizes the age-specificity of developing generalizable cognitive strategies. Instrumental Enrichment does not assume that generalization will automatically occur. A "bridging" exercise is done daily in which the teacher overtly and actively promotes transfer by the student of skills to real life situations. This activity occurs during group discussion for insight and requires specific teacher training.

The goals of Instrumental Enrichment are:

1. to correct deficient cognitive functions such as:
  - a. improving performance in spatial relations
  - b. improving performance in abstract analogies,
  - c. improving the ability to use more than one rule to solve a problem,
  - d. Fostering more systematic approaches to problem solving,
  - e. Fostering more accurate reading and following of directions,
  - f. Better use of appropriate language for planning and sequencing events.
2. To develop motivation to work on a task because of the nature of the task and its mastery.
3. To produce insight and understanding of one's own thought processes, and the underlying reasons for success and failure.
4. To create both an intrinsic need system and proper work habits so that the use of acquired operations, techniques, strategies and processes will be spontaneous and automatic.
5. To help the slow performer change his attitude toward himself as a passive recipient and reproducer to that of an activity generator of information, with the ability to infer and reach proper conclusions.

Feuerstein (1980) provides an excellent overview of the goals and structure of Instrumental Enrichment in chapter six.

The major goal of Instrumental Enrichment is to increase the person's capacity to learn. The subgoals outlined by Feuerstein (1980) are:

1. The correction of cognitive deficits of the culturally deprived person.
2. The acquisition of "...concepts, labels, vocabulary, operations, and relationships necessary for Instrumental Enrichment..." (Feuerstein, 1980, p. 115).
3. Intrinsic motivation through habit formation.
4. Reflective, insightful processes.
5. Task-intrinsic motivation.
6. Self perception as an idea generator.

The characteristics of Instrumental Enrichment are the structured nature of the material, the instrumental nature of the material and the content-free nature of the material. The material is structured in units or instruments that each address a cognitive function. The Learning Potential Assessment Device identifies those cognitive functions that are deficient. The materials are viewed as a means to achieve a solid cognitive structure. The materials are content free, as much as possible. The content free material facilitate cognitive development.

The learner, teacher, previous failures and materials used may inhibit learning. According to Feuerstein and others (1967, 1972, 1974, 1977, 1981) the students resistance to reflective behaviors that are necessary for organizing, elaborating and analyzing are characteristic of the "action addict" who is accustomed to very concrete operations. This characteristic is marked by impulsivity and inattentiveness. The material must be content free to be useful in developing cognitive structures, the teacher's role, in the Instrumental Enrichment model, is to encourage and reinforce operational thinking in the deprived person. Therefore, conventional time/material covered efficiency mind sets are not appropriate. The teacher is trained to use the materials prepared by Feuerstein in the recommended sequence. Previous attempts (1957) to have the teacher design materials failed. When all forms of resistance are removed, remarkable strides in learning occur. The case histories described by Feuerstein are impressive. In the Appendix of Instrumental Enrichment Feuerstein (1980) provides a functional listing of program characteristics which follows.

APPENDIX:

CHARACTERISTICS OF THE FEUERSTEIN INSTRUMENTAL  
ENRICHMENT PROGRAM

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<u>Program Characteristics</u>	<u>Instrumental Enrichment Program</u>
General goal:	To render the culturally deprived retarded performer more modifiable in his direct exposure to sources of stimuli and in his encounters with academic and life experiences.
Specific subgoals:	Correction of deficient cognitive functions. Acquisition of vocabulary, labels, concepts, operations, and relationships relevant to program. Formation of habits. Production of intrinsic motivation. Creation of insight and reflective thinking. Shift from role of passive recipient and reproducer of information to role of active generator of new information.
Target population: Age:	Ages 11-12 to adulthood for culturally deprived. Ages 9 to adulthood for normal with specific problems.
Level of functioning:	40 IQ to 90 IQ for culturally deprived. Certain learning disabilities           for normal Certain cognitive deficiencies           or gifted.
Minimal abilities:	Accessible to verbal or other kinds of information. Minimal visual-motor functioning. Accessible to training in elementary graphic activity to be used in paper-and-pencil exercises.
Scholastic achievement:	Irrelevant for application. Many instruments accessible to illiterates.
Types of motivation:	Task-intrinsic. Socially reinforced through peer and teacher interaction. Accessible for many scholastically unmotivated children. Appropriate for inhibited young adults who are not willing to accept regression to low level required for acquisition of basic school skills.



Program Characteristics

Instrumental Enrichment Program

• Etiology and pathological entity:

Culturally and socially disadvantaged retarded performers.  
The culturally different.  
Educable mentally retarded.  
Retarded functioning with organic or genetic substrata.  
Unorganized, unmotivated normal individuals who require the acquisition of work habits, strategies and insight.  
Perceptual deficits and learning disabilities.  
Traumatic, organic syndromes.

Settings:

Classroom; resource room.  
Individual tutorial setting.  
Prescriptive remedial setting.  
Extracurricular setting.  
Under certain conditions, self-administration.

Teachers:

Especially trained for Instrumental Enrichment.  
No other formal academic prerequisites essential.

Optimal time framework:

Three to five hours weekly, at spaced intervals.

Scholastic framework:

Complementary to regular curriculum.  
Complementary to content learning or instruction in basic school subjects and mastery of skills in reading and mathematics for those with learning disabilities.  
Extracurricular material for settings outside of schools.

Nature of materials:

Paper-and-pencil exercises.  
Divided into instruments, each of which focuses on a particular cognitive function but addresses others as well.

Rhythm of work:

Contingent upon setting.  
In classroom, pace regulated by mastery, with individualized attention, as necessary.  
In tutorial settings, individualized and flexible.

Nature of peer interaction:

Cooperative definition of problem.  
Participation in divergent proposals for solutions.  
Group discussions for insightful interpretation of FIE activities, generally, and specific tasks.  
Peer-assisted interactions.

Program Characteristics

Instrumental Enrichment Program

Interaction with teacher:

Presentation of task; explanation of terms; preparation for independent work; exploration of processes and strategies; orienting; producing insightful, reflective thinking; teaching specific content-related elements necessary for FIE; addressing specific deficient cognitive functions (Chapter 4), the cognitive map (Chapter 5), and the subgoals of the program (Chapter 6); producing motivation by means of reinforcement; initiating peer interaction; and producing bridging to content areas and life at large.

Nature of exercises:

Content-free in that content is not goal per se but a carrier for differential focus on cognitive functions to be corrected, developed, and enhanced.

Nature of activity:

Discovery, learning, and repetitive application in varied situations or relationships, rules, principles, operations, strategies, and other prerequisites of adequate cognitive functioning.

Nature of sequence:

Each instrument graded in difficulty, with tasks becoming progressively more complex in their presentation.  
Repetition of principles and operations with orientation to rules and strategies in various situations that require investment for solution.

Type of feedback:

Self-corrective devices in some instruments. Teacher assists in exploration of nature of process and in interpretation of micro-changes. Mutual feedback through peer interaction. Self-criticism, with the development of criteria and autonomy.

Reinforcement:

Strong task-intrinsic motivation developed with activity.  
Teacher's reinforcement directed to creating student understanding of his accomplishments.

Evaluation:

Teacher:

Student's efficiency in handling tasks himself. Student's mastery and facilitation of transfer to other, similar tasks, including summary pages. Student's spontaneous use of learned rules and strategies in other subject matter or Instrumental Enrichment materials.

Program Characteristics

Instrumental Enrichment Program

Evaluation, continued  
Child:

Self-evaluation on objective measurable criteria, such as speed, accuracy, positive responses, decrease in impulsivity as evidenced by decrease in erasures, etc.

Self-evaluation on subjective reports, feedback from teachers and peers, and evaluations of other teachers.

Program:

Cognitive changes; effects on school achievements; effects on adaptation; effect on school attendance; effect on behavior in other classes and in public, communal areas.

Services given to teacher:

Training in theory and practice of FIE; in-service field training and consultation during classroom visits; orientation; workshops after initial training in didactics and implementation. Lectures on the culturally deprived retarded performer, non-intellective factors in the program, etc.

Spill-over effects of  
program:

Teacher:

Training and experience with FIE effect changes in teacher's perception of the child; in his evaluation and expectations of the child's modifiability; in his attitude regarding the capacity of the retarded performer; in lessened use of the concrete in favor of more abstract; in process rather than product orientation. Knowledge of cognitive structure may make teacher more sensitive to aspects of teaching necessary for changes in both cognitive and personality structures or dimensions.

Child:

Increased willingness to cope with school material.

Increased motivation and school attendance.

Heightened self-image.

Parents:

Exposed to success of the child, parents may modify their levels of expectation and image of the child.

Administrative decisions  
on program:

Through regular decision-making channels for classroom implementation.

Teacher, educational counselor, psychologist, or educational supervisor for individual, remedial work or prescriptive teaching.

Program Characteristics

Budget:

Production and distribution  
of materials used in  
program:

Instrumental Enrichment Program

From education funds.

Covers the cost of material, training, and  
in-service supervision and consultation.

FIE materials are disseminated only to teachers  
who have received training.

Material is not bound, but distributed to child  
page by page.

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APPLICATION OF FEUERSTEIN'S MODEL

Gallaudet - MSSD

A. Jonas and Martin (1984) completed an initial report on a long term matched group study of Instrumental Enrichment applied to MDDS students during the 1982-1983 school year. The researcher goals were those of Feuerstein's model.

The primary goals of Instrumental Enrichment include:

- a. improving performance in spatial relationships,
- b. improving performance in analogies,
- c. improving the ability to use more than one rule to solve a problem,
- d. fostering more systematic approaches to problem solving,
- e. fostering more accurate reading and following directions,
- f. increasing use of appropriate language for planning and sequencing events.

Long term goals are to improve math and reading skills.

After one year the Instrumental Enrichment group's performance on Raven's Progressive Matrices (measures logical and deductive reasoning) was three times higher than the control group. The Instrumental Enrichment group scored higher on Problem-Solving solutions. The Instrumental Enrichment group made gains in work habits and classroom behaviors. Jonas and Martin (like Feuerstein) concluded that:

1. The Instrumental Enrichment program could be beneficial to the hearing impaired, even, if started in late adolescence.
2. Teacher training on content-free cognitive materials is essential for the success of the intervention.
3. Dissemination of the results and replication is appropriate.

GALLAUDET COLLEGE

David Martin used the Instrumental Enrichment Model to develop a pre-service teacher education program at Gallaudet College. Results indicate that cognitive modification using Instrumental Enrichment is possible and desirable to improve the intellectual functioning of hearing impaired teacher candidates. This training allows teachers-to-be to systematically plan and implement their professional responsibilities and better develop the cognitive skills of hearing impaired students.

Research in the application of Feuerstein's Model to the learning disabled continues at Gallaudet College. The initial results of studies on cognitive skill development are impressive. However, more research needs to be conducted. Subsequent literature searches may merely add the Instrumental Enrichment Model to the long list of fashionable trends in special education programming.

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